

**AMENDMENTS TO THE SPECIFICATION:**

Please insert the following paragraph prior to the paragraph beginning on page 7, line 29.

In other aspects, the present invention relates to a photolytic apparatus for oxygenating and removing carbon dioxide and hydrogen gas in order to maintain a proper physiological environment comprising: a photolytic cell having an anode compartment and a cathode compartment, a) said anode compartment having an inlet for receiving an aqueous solution, an anode conductor, a photo-reactive surface, and an outlet for transporting a dissolved oxygenated solution out of said anode compartment, wherein said photo-reactive surface has the ability, upon photo-activation, to convert water in an aqueous solution to dissolved oxygen, hydrogen ions and electrons upon light activation; b) said cathode compartment having an inlet for receiving carbon dioxide, C<sub>5</sub> pentose, and a catalyst, a cathode conductor for converting hydrogen ions, carbon dioxide, C<sub>5</sub> pentose and catalyst to C<sub>6</sub> hexose, and an outlet for removing the C<sub>6</sub> hexose from the cell and any remaining reactants, wherein said cathode conductor is connected to said anode conductor; and a light source for providing light photons to said photo-reactive surface to initiate a series of chemical reactions that results in dissolved oxygen generation in the anode compartment and C<sub>6</sub> hexose formation in the cathode compartment; wherein said photo-reactive surface further comprises a disproportionation catalyst including at least one of Fe<sup>II</sup>, Fe<sup>III</sup>, Cu<sup>I</sup>, Cu<sup>II</sup>, Co<sup>I</sup>, Co<sup>II</sup>, Mn<sup>II</sup>, Mn<sup>III</sup>, Mn<sup>IV</sup>, and MnO<sub>2</sub>; wherein said cell is constructed of self-assembled monolayers on mesoporous supports.